

2016-06-01

Standardization of guidelines for patient photograph deidentification

Roberts EA, Troiano C, Spiegel JH. Standardization of Guidelines for Patient Photograph Deidentification. *Annals of plastic surgery*. 2016 Jun 1;76(6):611-4.

<https://hdl.handle.net/2144/22096>

"Downloaded from OpenBU. Boston University's institutional repository."

Standardization of Guidelines for Patient Photograph Deidentification

Erik A. Roberts BS, Chelsea Troiano MD, and Jeffrey H. Spiegel MD

Importance: This work was performed to advance patient care by protecting patient anonymity.

Objectives: This study aimed to analyze the current practices used in patient facial photograph deidentification and set forth standardized guidelines for improving patient autonomy that are congruent with medical ethics and Health Insurance Portability and Accountability Act.

Design: The anonymization guidelines of 13 respected journals were reviewed for adequacy in accordance to facial recognition literature. Simple statistics were used to compare the usage of the most common concealment techniques in 8 medical journals which may publish the most facial photographs.

Setting: Not applicable.

Participants: Not applicable.

Main Outcome Measures: Facial photo deidentification guidelines of 13 journals were ascertained. Number and percentage of patient photographs lacking adequate anonymization in 8 journals were determined

Results: Facial image anonymization guidelines varied across journals. When anonymization was attempted, 87% of the images were inadequately concealed. The most common technique used was masking the eyes alone with a black box.

Conclusions: Most journals evaluated lack specific instructions for properly de- identifying facial photographs. The guidelines introduced here stress that both eyebrows and eyes must be concealed to ensure patient privacy. Examples of proper and inadequate photo anonymization techniques are provided.

Relevance: Improving patient care by ensuring greater patient anonymity.

Key Words: facial recognition, patient privacy, facial photographs, medical literature, photographs, HIPAA, standardized guidelines

Introduction

Facial photographs are common in the medical literature. In order for photos to be used ethically, patient consent must be obtained prior to publication. In instances when this does not occur, photos can legally be published if they are thought to lack identifiable features. However, the common practice of de-identifying photos by eye concealment may violate federal law and medical ethics due to its insufficiency. In this article, we describe pertinent findings from facial perception studies, review photo guidelines of thirteen medical journals, and report rates of different facial concealment techniques. Standardized evidence-based guidelines for facial image de-identification that include both eye and eyebrow masking are proposed.

Health Insurance Portability and Accountability Act Guidelines

Respecting patient privacy as part of patient autonomy is a cornerstone of medical ethics and has been incorporated into federal law. According to the Health Insurance Portability and Accountability Act (HIPAA), Individually Identifiable Health Information, including a patient photograph, is protected when “there is a reasonable basis to believe it can be used to identify the individual”¹. Without patient permission, an expert must justify the adequacy of de-identification for facial images to be releasable. Otherwise, the face must be cropped out of pictures. Since there has not been expert consensus on proper de-identification of images, the legality of publishing partially masked facial photographs has been unclear. The definitive legal test is whether patients can identify themselves in photographs lacking consent, as has been reflected in court cases².

Facial Perception Literature

Early studies concluded that the most important features for human facial recognition perception in order of importance are the eyes, mouth, and nose, although the eyes and eyebrows were treated as one unit³⁻⁵. More recently, eyebrows alone have been recognized for their essential role in communication, emotional expression, gender discrimination, and facial recognition⁶⁻⁹. The most current data suggests that eyebrows are more important than the eyes⁹. These results inform us that obscuring the eyes *and* eyebrows is required at a minimum to protect patient anonymity.

Current Practices

The current de-identification practices of thirteen respected medical journals were assessed to determine if they were congruent with the evidence-supported practice of concealing both eyes and eyebrows when anonymizing photos (Table 1). All journals required written patient consent to publish identifiable photos. Five journals did not discuss anonymization methods in their guidelines. For these journals, it is possible that any de-identification method would be permissible, including the inadequate eye-alone masking. We were pleased to find that seven journals do not permit eye concealment as an anonymization method. Intriguingly, the *Journal of Oral and Maxillofacial Surgery* actually recommends using eye concealment in lieu of patient consent. However, its guidelines do not mention including eyebrows in the obscured area, and eyebrow masking is rarely practiced.

In addition to evaluating patient image guidelines, we examined all 2011-2012 issues of eight medical journals that may frequently display facial photographs to determine which anonymization techniques authors utilize. The following journals were reviewed: *Annals of Internal Medicine*, *The Journal of the American Medical Association (JAMA)*, *Archives of Dermatology* (now *JAMA Dermatology*), *Archives of Facial Plastic Surgery* (now *JAMA Facial Plastic Surgery*), *Journal of Oral and Maxillofacial Surgery*, *The New England Journal of Medicine*, *Otolaryngology Head and Neck Surgery*, and *Pediatrics*. Of the eight journals examined, only three contained articles with some form of facial masking (Table 2). This analysis was insensitive to de-

identification using image composites, an effective method of covert anonymization. Given the laborious workflow for that technique, we infer that its use is rare.

We most often observed clinical images with cropped out patient faces, in full compliance with HIPAA guidelines (data not published). Of the 180 facial images found, 156 (87%) were de-identified by masking the eye region alone, while only 24 (13%) also masked the eyebrows (Table 2). Most commonly, authors placed a single black bar across the eye region (Figure 1H). Some authors used ovals (Figure 1G), boxes, blurring (Figure 1B), or pixilation (Figure 1E) to obscure the eyes separately. These different methods of masking the eyes alone are insufficient to ensure patient privacy. Indeed, a report by The International Committee of Medical Journal Editors affirms that “complete anonymity is difficult to achieve” and that “masking of the eye region in photographs of patients is inadequate protection of anonymity”¹⁰.

New Guidelines for Best Practice

When publishing facial photographs, patient consent is the best option. When this is not achievable, or if consenting patients prefer anonymity, we propose the following guidelines for publishing facial photographs:

- 1) Seek informed patient consent whenever possible
- 2) Conceal unique and distinguishing features by cloning over the area with neighboring skin
- 3) Mask as much of the face as possible, including the eyes and eyebrows at a minimum, using one of the following techniques:
 - a. Cloning neighboring skin (Figure 1D) — our preferred method since it is less pronounced than other approaches and is evidence-supported¹¹
 - b. Blurring (Figure 1C)
 - c. Opaque box (Figure 1I) — despite being the most common method, it is unsightly and distracting so other techniques should be used instead whenever possible
 - d. Coarse Pixilation (Figure 1F)
- 4) Confirm patient approval of the finalized photograph before publishing whenever possible

Pixilation can look most natural since it maintains high contrast with natural pixel values. However, the end result may look similar to eyes or eyebrows and facilitate recognition if pixels are too fine, as has been suggested in a related setting (Figure 1E)¹¹.

An emerging concern is the rapid advancement in facial recognition software. While early algorithms relied on measurements that would be hindered by eye with eyebrow masking, future machine learning-based algorithms may circumvent this de-identification strategy. It is possible that complete de-identification may be impossible to achieve as technology advances.

Conclusions

Although facial recognition is an evolving science, current knowledge suggests that the eyebrows are at least as significant as the eyes in facial identification. All 13 prominent medical journals examined failed to instruct authors in the current best practice technique for facial masking, which includes both eye and eyebrow concealment. In fact, 2 promoted the use of inadequate technique. Due to insufficient guidelines, the 3 journals reviewed in detail had an inconsistent degree of inadequate facial masking with rates ranging from 10 of 17 (59%) to 138 of 151 (91%) (Table 2). At least half of all published patient photos, where consent was not obtained, were not adequately deidentified.

Our data underscore the importance of adopting new standardized guidelines based on the current evidence in the literature. Protecting patient's privacy is a cornerstone of medical ethics and is taken seriously in the medical community. As we have defined these subtle nuances in facial recognition, we should now use them to our advantage to protect our patient's privacy in the medial literature. In accordance with the guidelines

proposed within, authors are encouraged to obtain permission for publication from all photographed patients and to mask both eyes and eyebrows. By following these guidelines, authors will be at the forefront in safeguarding patient privacy and HIPAA compliance.

Table 1: Journal patient photograph policies

Photo Policy	Journals	#Journals
Consent for Identifiable	<i>British Medical Journal, The New England Journal of Medicine, Annals of Internal Medicine, International Journal of Oral and Maxillofacial Surgery, Pediatrics</i>	5
Consent for Identifiable but No Eye Masking	<i>British Journal of Dermatology, Lancet, JAMA, Journal of Pediatrics, Otolaryngology Head and Neck Surgery, Plastic and Reconstructive Surgery</i>	6
Consent for Identifiable or Use Eye Masking	<i>Journal of the American Academy of Dermatology, Journal of Oral and Maxillofacial Surgery</i>	2

Table 2: Number of de-identified patient photographs by journal and region of concealment

Journal	Concealed Area		Total
	Eyes Only	Eyes and Eyebrows	
<i>The New England Journal of Medicine</i>	10 (59%)	7 (41%)	17
<i>Otolaryngology – Head and Neck Surgery</i>	8 (67%)	4 (33%)	12
<i>Journal of Oral and Maxillofacial Surgery</i>	138 (91%)	13 (9%)	151
All	156 (87%)	24 (13%)	180

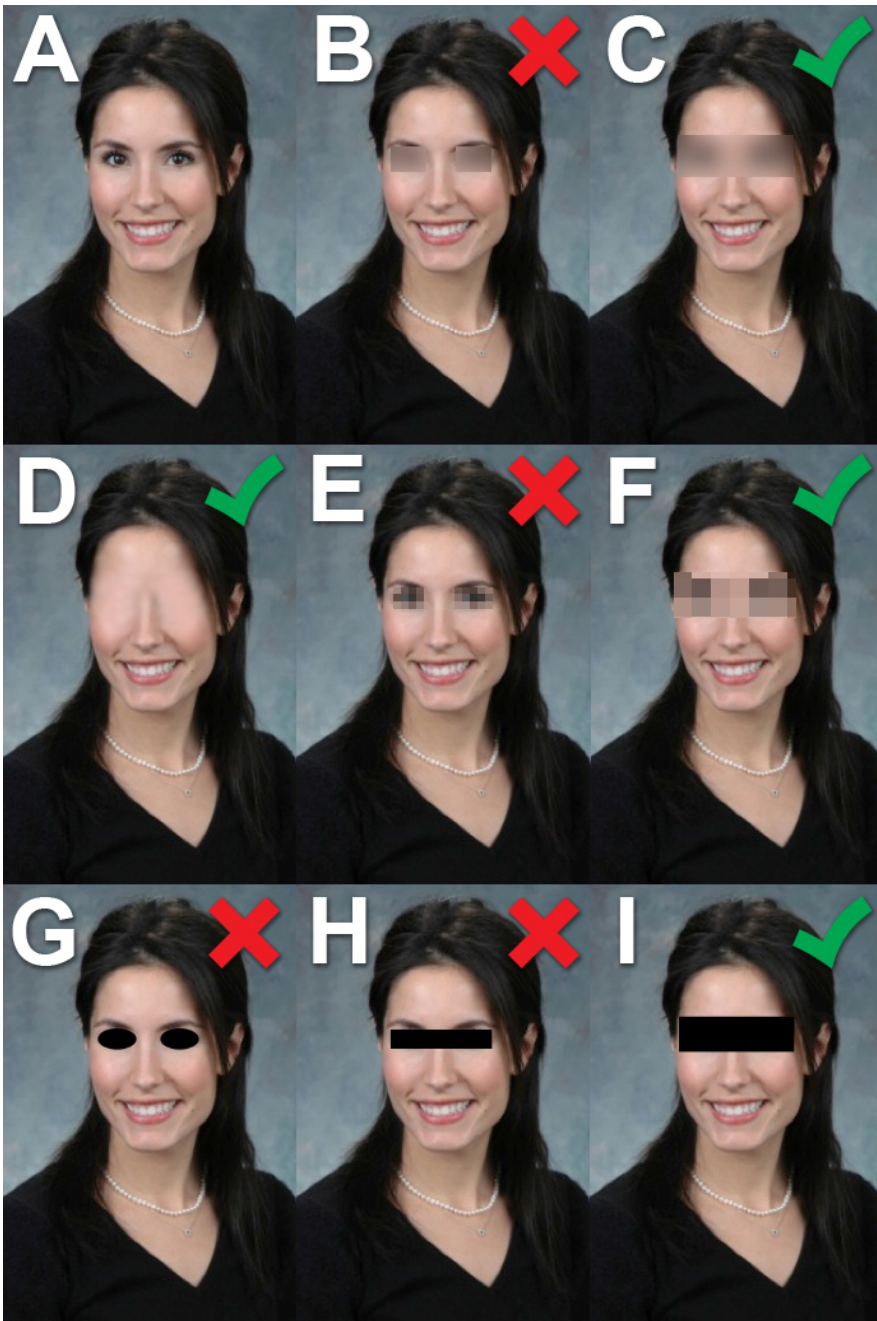


Figure 1: Examples of Facial Masking Methods. Panel A shows the unedited photo. The improper eye blurring in panel B is corrected in panel C, with eye and eyebrow blurring. Panel D exemplifies our preferred method of cloning neighboring skin over the eyes and eyebrows. Panel E is an example of incorrect fine pixilation of only the eyes, which is rectified with coarse pixilation of both eyes and eyebrows in panel F. An example of oval eye masking is shown in Panel G. The inappropriate yet most commonly used de-identification method of eye-alone concealment with a black box is found in panel H. The correct technique of eye and eyebrow masking is shown in panel I.

References

1. Summary of the HIPAA privacy rule. 2003:1-25.
<http://www.hhs.gov/ocr/privacy/hipaa/understanding/summary/index.html>.
2. Harting MT, DeWees JM, Vela KM, Khirallah RT. Medical photography: Current technology, evolving issues and legal perspectives. *Int J Clin Pract*. 2015;69(4):401-409. doi: 10.1111/ijcp.12627.
3. Davies G, Ellis H, Shepherd J. Cue saliency in faces as assessed by the 'photofit' technique. *Perception*. 1977;6(3):263-269. <http://www.perceptionweb.com/abstract.cgi?id=p060263>. doi: 10.1068/p060263.
4. Fraser I, Craig G, Parker D. Reaction time measures of feature saliency in schematic faces. *Perception*. 1990;19(5):661-673. <http://www.perceptionweb.com/abstract.cgi?id=p190661>.
5. Haig ND. Exploring recognition with interchanged facial features. *Perception*. 1986;15(3):235-247.
<http://www.perceptionweb.com/abstract.cgi?id=p150235>.
6. Ekman P. About brows: Emotional and conversational signals. In: von Cranach M, Foppa K, Lepenies W, Ploog D, eds. *Human ethology: Claims and limits of a new discipline*. Cambridge: University Press; 1979:169-202. 10.1002/1098-2337(1981)7:3<280::AID-AB2480070316>3.0.CO;2-Q.
7. Ekman P. Facial expression and emotion. *Am Psychol*. 1993;48(4):384-392. doi: 10.1037/0003-066X.48.4.384.
8. Spiegel JH. Facial determinants of female gender and feminizing forehead cranioplasty. *Laryngoscope*. 2010;121(2):250-261. <http://doi.wiley.com/10.1002/lary.21187>. doi: 10.1002/lary.21187.
9. Sadr J, Jarudi I, Sinha P. The role of eyebrows in face recognition. *Perception*. 2003;32(3):285-293.
<http://eutils.ncbi.nlm.nih.gov/entrez/eutils/elink.fcgi?dbfrom=pubmed&id=12729380&retmode=ref&cmd=prlinks>.
10. Editors, International Committee of Medical Journal. Protection of patients' rights to privacy. *BMJ*. 1995;311(7015):1272.
<http://eutils.ncbi.nlm.nih.gov/entrez/eutils/elink.fcgi?dbfrom=pubmed&id=11644736&retmode=ref&cmd=prlinks>.
11. White M. Removing eyebrows impairs recognition of famous faces, or doesn't, depending on how the eyebrows are removed. *Perception*. 2004;33(10):1215-1220.
<http://eutils.ncbi.nlm.nih.gov/entrez/eutils/elink.fcgi?dbfrom=pubmed&id=15693666&retmode=ref&cmd=prlinks>.